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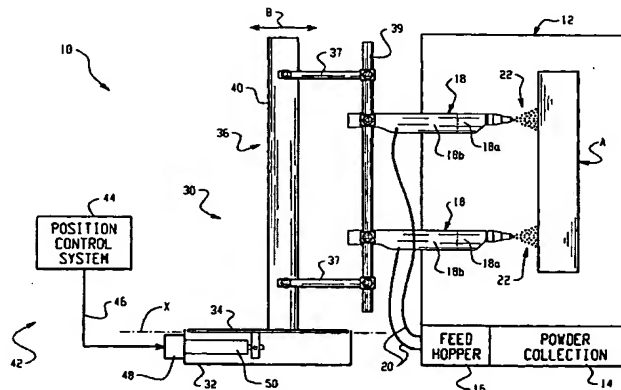
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- Published:**
— with international search report

[Continued on next page]

(54) Title: **SPRAY GUN CLEANING ARRANGEMENTS**



(57) Abstract: Apparatus and methods are provided for removing powder overspray from the exterior surfaces within a spray booth, especially the exterior surfaces of a spray gun assembly. These surfaces may include the spray gun housing and nozzle, a tube mount housing for the tube mount configurations, and in some embodiments the various hoses and lines that are coupled to the spray gun in a bar mount configuration. In one embodiment, powder overspray is removed from such surfaces or other surfaces within the spray booth by applying a cleaning or powder removal agent/article in contact with the surfaces to knock off, wipe, blow or otherwise remove the powder overspray. The cleaning agent/article may take many forms, including but not limited to fluids including air or liquid, negative pressure or suction, charged ions, positive pressure within the spray gun assembly, or any number and variety of cleaning devices such as but not limited to brushes, cloth, sponges, wipers and so on. A number of embodiments are described, including but not limited to the use of vacuum or negative pressure nozzles, negative pressure with a cleaning media, a cryogenic rinse, wiping contact articles such as rags, brushes, sponges or rubber/plastic wipers, oppositely charged particles, and air flow pressurized air from within the spray gun assembly so as to blow off or knock off the powder overspray via a flexible boot or bladder.

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— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/08578

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B05B15/02 B05B15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 346 553 A (PINGEL JOACHIM) 13 September 1994 (1994-09-13) column 3, lines 33,34 abstract -----	1-7,21, 22
X	DE 39 33 745 A (HESTERMANN GERHARD) 11 April 1991 (1991-04-11) column 8, line 42 - line 61 figures -----	1,2,21
A	US 5 759 271 A (BUSCHOR KARL) 2 June 1998 (1998-06-02) the whole document -----	1-7,21, 22

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/08578

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-7, 21, 22

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7 21-22

The prior art US5759271 (document D1) discloses a spray booth with powder spray nozzles and compressed air nozzles designed to blow off the powder overspray from the powder spray nozzle.

The first invention discloses an apparatus for removing powder overspray from a powder spray gun. It differs from the prior art in that it is featuring a cleaning device in fluid communication with a source of negative pressure.

~~The STF (Special Technical Feature) in the sense of Rule 13 PCT of the first invention is considered to be the feature of claim 1:~~
~~-a cleaning device positioned with respect to an exterior surface of a spray gun,~~
~~-said cleaning device in fluid communication with a source of negative pressure.~~

The problem solved thereby is how to clean the nozzle without dispersing the powder, and how to collect the powder at the same time.

2. claims: 8-10 23-21

The second invention discloses an apparatus for cleaning powder off a spray gun. Its STF is considered to be a cleaning device provided with wiping or brushing elements.

The problem to be solved by this feature is how to remove the overspray powder from the spray gun.

3. claims: 11-13 25

The third invention discloses an apparatus for removing powder overspray from a powder spray gun. Its STF is considered to be a cryogenic fluid in contact with the spray gun.

The problem to be solved by this feature is considered to be an effective cleaning without damaging the surface.

4. claims: 14-15 26-27

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

The fourth invention discloses an apparatus for removing powder from a spray gun. Its STF is considered to be bringing charged particle into contact with the gun's housing.

The problem to be solved by this feature is how to remove powder from the spray gun without the use of a gas.

5. claims: 16-17 28-29

The fifth invention discloses a powder spray gun. Its STF are considered to be:

-an external housing made of porous material,

~~-a pressurized air source.~~

The problem to be solved by this feature is how to prevent powder overspray on the housing exterior surface.

6. claims: 18-20 30

The sixth invention discloses a powder spray gun. Its STF are considered to be:

-an external housing made of flexible material,

-a pressurized air source.

The problem to be solved by this feature is how to remove powder overspray from the spray gun housing exterior surface without involving positioning of the spray gun with respect to external powder cleaning apparatuses.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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